- VOLUME G -

IN THE UNITED STATES DISTRICT COURT

IN AND FOR THE DISTRICT OF DELAWARE

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MONSANTO COMPANY,	:	CIVIL ACTION
Plaintiff	:	
v.	:	
MYCOGEN PLANT SCIENCE, INC., AGRIGENETICS, INC. and NOVARTIS CORPORATION,	:	
Defendants	:	NO. 96-133 (RRM)

- - -

Wilmington, Delaware
Thursday, June 25, 1998
8:55 o'clock, a.m.

- - -

BEFORE: HONORABLE RODERICK R. McKELVIE, U.S.D.C.J.

- - -

APPEARANCES:

POTTER, ANDERSON & CORROON
BY: WILLIAM J. MARSDEN, JR., ESQ.

-and-

Official Court Reporters

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A. This is a DNA sequence document that was printed from the VACS computer at Monsanto at the time I was there. The FJPERL is Fred's designation. So this would be one of Fred's documents. And the-BTOURS would suggest that this is a Bt sequence.

And inside, you see sequence of DNA and coding sequence. There is yellow highlighting. That highlighting was characteristic of the way Fred would mark sequences that he thought might be problematic for plant expression.

Q. Do you recall ever observing Dr. Perlak make markings on a document similar to that?

A. Yes.

Q. And when did you first see Dr. Perlak make markings on a document similar to PTX-157

A. Within a short time after my arrival, within a few weeks after my arrival.

Q. Do you recall how frequently you saw Dr. Perlak working on the Bt redesign project?

A. This was his main focus when I arrived at Monsanto. He worked on this regularly. Very often.

Q. I am going to hand to the witness what has been marked as PTX-180. Have you seen PTX-180 before, Dr. Hanley-Bowdoin?

A. Yes. This is a manuscript and a table that is

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codons that are used in genes that are expressed in various biological systems. So it would be, for example, a table that you would use to change the codons used in a bacterial gene to be optimized for plants.

Q. Was PTX-180 readily available in Monsanto?

A. Yes, it was.

Q. Did you ever observe Dr. Perlak using PTX-180?

A. Yes, I did. We had, in our office that we shared, it was a U-shaped office, and there was a table that separated our two desks on which there was a computer that we shared. And over that computer, Fred had these kinds of tables posted for him to work from. So, yes, I have seen this in the office.

Q. When was the first time that you recall seeing Dr. Perlak using Exhibit PTX-180?

A. It was there when I got there.

Q. And did you see him use it?

A. Yes.

Q. Within what time frame?

A. Shortly after I arrived, within a few weeks, again.

MR. LEE: No further questions.

CROSS-EXAMINATION

BY MR. DRIVAS:

Q. Good afternoon, Doctor.

How long did you share an office with Dr.

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Perlak?

A. For a year.

Q. Did he work throughout that time on this sequence, this Bt sequence?

A. Yes.

Q. Did he throughout that time work on highlighting and modifying printouts such as this?

A. Most of that went on early after I arrived.

Q. Did he continue doing that over a period of time?

A. Yes.

Q. Did he use a number of different documents like this?

A. I can't speak to that.

Q. Now, you said that somebody showed you this document earlier today. Did you recognize it when somebody showed it to you?

A. Yes, I did.

Q. This specific document?

A. I recognize the way this is coded. I recognize Fred's designation. I recognize the title. I recognize how it was generated. And I recognize internal to this the kinds of documents that Fred was using at the time.

Q. The kinds. What about the specific document?

A. I can't speak to that, no, I can't say for a fact this particular document.

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Q. And can you identify any time or date as to when the changes were made in a document like this?

A. No, I cannot, not specifically.

MR. DRIVAS: Thank you. No further questions.

MS. MAHANEY: No questions, your Honor.

MR. LEE: No questions.

MR. LYNCH: May Dr. Hanley-Bowdoin be excused, your Honor?

THE COURT: Yes, you are excused.

(Witness excused)

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MS. KNOLL: Your Honor, Monsanto calls Dr. Tom Rogers.

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... THOMAS E. ROGERS, having been duly sworn as a witness, was examined and testified as follows ...

MS KNOLL: Ladies and gentlemen, Dr. Rogers is currently an employee with Monsanto. In 1986 he was in charge of the DNA synthesis group at Monsanto. And he is going to tell you also about his connections and relations with Dr. Perlak during that time period.

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DIRECT EXAMINATION

BY MS. KNOLL:

Q. Dr. Rogers, would you please introduce yourself to the jury?

A. I am Thomas Rogers from St. Louis, Missouri.

Q. What work do you do at Monsanto today?

A. Currently I am involved in Human Integrins research, the Pharmaceutical Division at Monsanto.

Q. What was your role at Monsanto during the 1986/1987 time period?

A. At that time, I was the leader of a nucleic acid chemistry crop, within Corporate Research at Monsanto. We had responsibility for all the oligonucleotide synthesis within the company.

Q. What did the molecular biology research groups do at Monsanto during that time frame?

A. Our function was to provide DNA for all the -- anybody who would request DNA for the research purposes at Monsanto.

Q. And during that time frame did you come to know a scientist by the name of Fred Perlak?

A. Yes, I did.

Q. Did you also know Dr. David Fischhoff?

A. Yes, I did.

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Q. How did you come to know those two individuals?

A. Well, we would have weekly group meetings, research group meetings, where Fred and Dave would present their research, and we would have a -- usually every month, would have a get-together at an off-site facility and have wine and cheese and that sort of thing. It was just a social sort of thing, in that regard.

Then, of course, in our normal daily contact with researchers, Fred and Dave were working oligonucleotides for their projects. So we would get involved with that on a daily basis.

Q. Where was your office relative to Dr. Perlak's during the 1986-'87 time frame?

A. Fred's office then was due west of mine, about 150 feet, on AA-2 in Chesterfield.

Q. During that time did you discuss with Dr. Perlak his work on synthetic Bt genes?

A. There were two conversations in particular in that regard. Either -- the first one either in late 1986 or early 1987. And the next one was two or three months after that. The first one involved Fred calling me -- I was down at his office, at any rate. And he discussed the problems he was having at that time with Bt expression in plants. And we discussed strategies. In particular,

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he discussed his strategies for ways to overcome lack of expression of Bt.

Q. Let me stop you there and ask you, what was the strategy that Dr. Perlak discussed with you at that time?

A. Well, the problem Fred saw was that they were dealing with plant -- bacterial codons, from the parent Bt gene. And his hypothesis was that if we converted that to plant-based codons that the expression levels would then be enhanced in the plant system.

Q. Now, Doctor, you mentioned a second conversation. When was the second conversation that you had a recollection about?

A. Well, as I mentioned, it was probably two or three months later. Fred was now going to actually begin ordering these oligonucleotides, and he wanted to know whether or not we had the capacity to handle the kind of level of synthesis he was going to require from us.

Q. What did you tell him?

A. That -- I can't remember precisely what level he was going to require. But that we would have no problems meeting the level of synthesis that he was going to need.

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Q. Now, when did this second conversation occur?

A. The second conversation would have been sometime in -- I would guess in the middle of 1987. Certainly prior to August 22nd, 1987.

Q. And how do you know that?

A. We went on vacation. My family and I went on vacation on August 22nd, the Saturday the 22nd to Colorado to attend my -- well, first of all, to spend a week at my in-laws in Colorado Springs and then attend my sister's wedding on September 3rd, 1987.

Q. Now, let me show you what has previously been marked as two exhibits, Plaintiff's Exhibits 32 and 72. And if you could, Dr. Rogers, tell us what those documents are, just in general terms?

A. The first document labeled 32 I believe is a collection of request forms that we would have received from the DNA Chemistry Group. And they begin -- this particular set begins September 24, 1987 from the name of requester is Fred J. Perlak, and then pretty much consecutively in reverse order to November 2nd 1987. Again, these all appear, in this particular number 32, Fred Perlak's.

Q. Now, what I would like to ask you first before we get to the specifics of these documents is how did the

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process work within Monsanto during the '86/87 time frame that a researcher like Dr. Perlak would do to get a piece of DNA synthesized?
A. At that time, the researcher would get on a computer program on the VACS computer and type in the sequence that they wanted, the unique name of the file sequence, and then description of use, and then that would be mailed to our group, Debbie Connors would receive these as mail messages. She would print out these forms as an automatic transfer of this particular mail message and a form that has information Fred would have sent or any requester would have sent, the details about how the synthesizer was going to be set up and how it would run and also purification scheme.
The second page – I won't read each one of these -- would be the sequence as we actually would have put it in. DNA synthesis machine would have been double-checked by another colleague before we started synthesis and then the date and name and that sort of thing. This actually came off the output of the synthesizer.
And then, at the end of the synthesis, and would have a table again from the synthesizer of actually what the synthesizer did. So basically the synthesizer was the robot and this is detailing what the robot did

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over that period of time.
Q. Now, at the time the researcher or Dr. Perlak sent these to you, he would have had to tell you what the sequence was going to be by the time you received it?
A. Yes. I absolutely would have to know the sequence.
Q. Now, the collection that you have in your hand that is Exhibit 32, these relate to Dr. Perlak's synthetic Bt work?
A. Well if one goes to the description of use, some cases it's specific. So for example, the item labeled BtK 181.RAQ which is MNP001-054034. The exhibit, description of use has, to quote:
"Sequence for the region of the BtK gene starting at the base pair 185, two changes in the codon used."
And we go through several of these, if you wish to show that, indeed, these were related to BtK genes.
Q. Okay. I think that is good for now. We've got an example.
I just have one last question for you, Dr. Rogers: At this time in Monsanto in 1986/1987, how common was it for somebody to resynthesize a gene or rebuild a gene like the one Dr. Perlak was working on?
A. Well, for me to specifically know whether someone

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is building a gene is fairly rare. Fred came to me specifically and said this is what we're going to do and did we have the capacity to do it, which was pretty novel at that time. Usually we're kept in the dark a little bit about actually what the use was going to be.
MS. KNOLL: Thank you, Dr. Rogers.
THE WITNESS: You're welcome.
CROSS-EXAMINATION
BY MR. DRIVAS:
Q. Good afternoon, Dr. Rogers.
A. Good afternoon.
Q. Are you a chemist by background?
A. I'm an organic chemist by background, yes, sir.
Q. Do you also design DNA sequences?
A. No. That's not generally my forte, although I've Done a fair amount of oligonucleotide research.
Q. So the practice researchers at Monsanto would Actually give you the sequence they wanted synthesized?
A. Yes, sir.
Q. And then you would have to check that once you made it?
A. Well, once we -- our procedure was, once it was entered in the machine, we would double-check to make sure that the sequence fidelity was correct.
Q. Is that critical in DNA chemistry?

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A. Absolutely.
Q. Why is that?
A. If there is any change you would make could mutate or probably would mutate depending where it is in the sequence the particular gene you are trying to modify and certainly a researcher wants to do a specific change and not have to fish out something he didn't intend.
Q. So even if you made a mistake in one of these bases, you could have a disastrous effect?
A. Could. Depends where it is on the sequence of the nucleotide.
Q. Okay. Now, could you look at Exhibit 32 –
A. Sure.
Q. – that was just handed to you? And if you could turn to the page marked MNP 001-054030.
A. (Witness complied.)
Q. 030 would be the last three digits?
A. Right.
Q. Yes.
A. I'll get there. Okay.
Q. Now, is this typical of the request that you would get from the researcher?
A. Yes.
Q. And do you see this BtK 240.REQ?
A. Yes, sir.